

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): M. FUNABASHI

Serial No.: Not Yet Assigned  
(Divisional Application of SN 09/392,568  
Filed: September 9, 1999)

Filed: July 12, 2001

For: METHOD OF MANUFACTURING A SEMICONDUCTOR  
INTEGRATED CIRCUIT DEVICE

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents  
Washington, D.C. 20231

July 12, 2001

Sir:

Please amend the above-identified application, prior to examination thereof, as follows:

IN THE SPECIFICATION:

Please add the following new paragraph on page 1, between the title and the heading "BACKGROUND OF THE INVENTION":

-- This application is a Divisional application of prior application Serial No. 09/392,568, filed September 9, 1999. --.

Please delete the paragraph bridging pages 2 and 3, and substitute therefor the following new paragraph:

-- Japanese Patent Application Laid-Open No. 6-41773 discloses a technique in which an anti-adsorption agent (such as NTPO, EDTPO, EDDPO, or the like) is added to an aqueous solution containing an alkaline component such as ammonium hydroxide, hydroxide of alkaline metal (KOH or NaOH), choline,

or the like, thereby to restrict adsorption of metal into the wafer surface. --.

Please delete the paragraph at page 7, lines 8-17, and substitute therefor the following new paragraph:

-- According to a second aspect of the present invention, there is provided a method of manufacturing a semiconductor integrated circuit device, comprising steps of (a) cleaning a surface of a silicon wafer with use of a processing solution containing hydrogen peroxide, hydracid fluoride salt, and water, (b) subjecting the silicon wafer to a heat treatment thereby to form a gate oxide film on the surface of the silicon wafer, and (c) patterning a conductive film deposited above the gate oxide film, thereby to form a gate electrode. --.

Please delete the heading at page 10, line 17, and substitute therefor the following new heading:

-- DESCRIPTION OF THE PREFERRED EMBODIMENTS --.

Please delete the paragraph on page 13, lines 7-17, and substitute therefor the following new paragraph:

-- Next, as shown in FIG. 4, a silicon oxide film 7 having a film thickness of about 800 nm is deposited, for example, by a CVD method using oxygen and tetraethoxysilane as a source gas. Thereafter, as shown in FIG. 5, the silicon oxide film 7 is polished by a Chemical Mechanical Polishing (CMP) method. As the silicon oxide film 7 remains only inside

the groove 5a with using the silicon nitride film 3 as a polishing stopper, an element separation 5 is formed. Subsequently, a heat treatment at about 1000 °C is carried out to densify (sinter) the silicon oxide film 7 in the element separation groove 5. --.

Please delete the paragraph bridging pages 15 and 16, and substitute therefor the following new paragraph:

-- The wafers 1 which have been loaded to the loader 101 of the cleaning/oxide-film-forming device 100 are transferred to the cleaning chamber 102, in units of every one or two sheet, and are dipped into a processing solution composed of a hydrogen peroxide, a hydracid salt fluoride and water. Here, the hydracid salt fluoride is, for example, tetraalkyl ammonium fluoride such as tetramethyl ammonium fluoride, tetraethyl ammonium fluoride, or ammonium fluoride. --.

Please delete the paragraph on page 22, lines 15-22, and substitute therefor the following new paragraph:

-- The strong alkaline component is, for example, tetraalkyl ammonium hydroxide such as tetramethyl ammonium hydroxide, tetraethyl ammonium hydroxide, or the like. Amine may be used instead of ammonium. The amine is, for example, primary amine such as monomethyl amine or monoethyl amine, secondary amine such as dimethyl amine or diethyl amine, or tertiary amine such as trimethyl amine or triethyl amine. --.

R E M A R K S

Applicants have amended their specification in light of the prosecution history of prior application Serial No. 09/392,568, and to refer to this prior application Serial No. 09/392,568 consistent with the requirements of 35 USC §120. It is respectfully submitted that these amendments to the specification do not add new matter to the application.

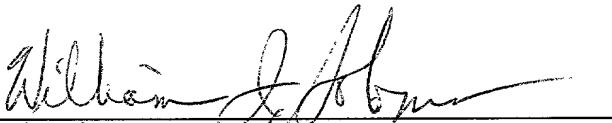
Entry of the present amendments, and examination of the above-identified application on the merits subsequent thereto, in due course, are respectfully requested.

Attached hereto is a marked-up version of the changes made in the specification by this Preliminary Amendment. This marked-up version is on the attached pages, the first page of which is captioned "VERSION WITH MARKINGS TO SHOW CHANGES MADE".

To the extent necessary, applicants petition for an extension of time under 37 CFR §1.136. Please charge any shortage in the fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 01-2135 (854.37558VX1) and please credit any excess fees to such deposit account.

Respectfully submitted,

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ATTACHMENT A

VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Specification:

Paragraph bridging pages 2 and 3 has been amended as indicated below:

Japanese Patent Application Laid-Open No. 6-41773 discloses a technique in which an anti-adsorption agent (such as NTPO, EDTPO, EDDPO, or the like) is added to an aqueous solution containing an alkaline component such as ammonium hydroxide, hydroxide of alkaline metal (KOH or [NAOH] NaOH) , choline, or the like, thereby to restrict adsorption of metal into the wafer surface.

Paragraph at page 7, lines 8-17, has been amended as indicated below:

According to a second aspect of the present [inveniton] invention, there is provided a method of manufacturing a semiconductor integrated circuit device, comprising steps of (a) cleaning a surface of a silicon wafer with use of a processing solution containing hydrogen peroxide, hydracid fluoride salt, and [wafer] water, (b) subjecting the silicon wafer to a heat treatment thereby to form a gate oxide film on the surface of the silicon wafer, and (c) patterning a conductive film deposited above the gate oxide film, thereby to form a gate electrode.

The heading at page 10, line 17, has been amended as indicated below:

DESCRIPTION OF THE PREFERRED [EMBDIMENTS] EMBODIMENTS

Paragraph on page 13, lines 7-17, has been amended as indicated below:

Next, as shown in FIG. 4, a silicon oxide film 7 having a film thickness of about 800 nm is deposited, for example, by a CVD method using oxygen and tetraethoxysilane as a [source] source gas. Thereafter, as shown in FIG. 5, the silicon oxide film 7 is polished by a Chemical Mechanical Polishing (CMP) method. As the silicon oxide film 7 remains only inside the groove 5a with using the silicon nitride film 3 as a polishing stopper, an element separation 5 is formed. Subsequently, a heat treatment at about 1000 °C is carried out to densify (sinter) the silicon oxide film 7 in the element separation groove 5.

Paragraph bridging pages 15 and 16 has been amended as indicated below:

The wafers 1 which have been loaded to the loader 101 of the cleaning/oxide-film-forming device 100 are transferred to the cleaning chamber 102, in units of every one or two sheet, and are dipped into a processing solution composed of a hydrogen peroxide, a hydracid salt fluoride and water. Here, the [hydrogen] hydracid salt fluoride is, for example, tetraalkyl ammonium fluoride such as tetramethyl ammonium fluoride, tetraethyl ammonium fluoride, or ammonium fluoride.

Paragraph on page 22, lines 15-22, has been amended as indicated below:

The strong alkaline component is, for example, tetraalkyl ammonium [hydro-oxide] hydroxide such as tetramethyl ammonium [hydro-oxide] hydroxide, tetraethyl ammonium [hydro-oxide] hydroxide, or the like. Amine may be used [in stead] instead of ammonium. The amine is, for example, primary amine such as monomethyl amine or monoethyl amine, secondary amine such as dimethyl amine or diethyl amine, or tertiary amine such as trimethyl amine or triethyl amine.